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PREPARATION FOR THE TEACHING OF GEOGRAPHY

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In his recent book entitled *Educational Problems,* Dr. G. Stanley Hall devotes a chapter to geography, in which he characterizes the teaching of this subject as ineffective, and the subject itself as a mass of unorganized facts drawn from practically every field of human thought. Dr. Hall is but one of many who have, during the last two decades, declared that geography is taught in a very unsatisfactory manner. That there is much force in the criticism, all will agree, but the real cause of the unsatisfactory conditions is almost universally overlooked.

Until recent years geography was defined as "a description of the earth's surface and its inhabitants", and it was taught in accordance with this definition. One who will seriously contemplate what this statement involves, will realize, at least in part, the tremendous responsibility which it placed upon the teacher. Geographers no longer accept this definition, however. The central thought today is *the relation between man and his environment.* Man's responses to his environment cannot be understood without a knowledge of the physical conditions responsible for them. The substitution of this conception for the old one has given geography an educational value of the highest order. It has at the same time very greatly increased the responsibility placed upon the teacher.

In seeking to explain why the teaching of geography is so unfruitful of good results, the unsatisfactory conditions are attributed to poor books, illogical courses of study, lack of maps and other illustrative material, and to the nature of the subject itself, but very seldom to the real cause: *lack of preparation on the part of teachers.* This remark is not made in the spirit of fault-finding; the writer is simply stating a fact that has not been generally recognized.

Let us consider the average teacher's opportunity to prepare herself to teach geography. Although the high school is not commonly thought of as furnishing any real preparation for teaching, we shall examine its course of study first. Of the total number of students enrolled in the public high schools of the United States in the 1909-10, but nineteen per cent. studied

geography. During the same period twelve per cent. of the students enrolled in the public high schools of California studied the subject. We must keep in mind that, with very few exceptions, high school geography is physical geography. This phase of the subject is absolutely essential as a foundation for any deep study of general geography, but it is not general geography. In other words, the high school offers no training in that field of geography which properly receives chief emphasis in the elementary school.

What are our normal schools doing to prepare teachers to teach geography? As these institutions exist for the sole purpose of fitting teachers for their work, we have the right to demand of the normal schools the fulfilment of the function for which they were created. Geography, as one of the fundamentals in the curriculum of the elementary school, should be a required subject in each one of the 264 normal schools in the United States. Investigations show that only about seventy-five per cent. of these institutions offer courses in geography, and in a very large number of cases the work is optional.

How is this condition to be accounted for? In many normal schools, high school graduates are given full credit for geography. The point of view in such cases is that the high school has given its graduates a teaching knowledge of geography, and that the normal school is, therefore, relieved from responsibility along this line. That this point of view is incorrect, there is abundant evidence. As has been stated, only nineteen per cent. of the students enrolled in the public high schools of the United States in 1909-10 were studying physical geography, while general geography is practically unknown in the secondary school.

An examination of the catalogs of a large number of normal schools in all parts of our country shows that where geography is taught, the length of the course is in nearly all cases one-third or one-half a year. Not infrequently this brief course is in part devoted to methods of teaching geography. The Montclair, New Jersey, normal school furnishes a very gratifying exception to the general rule. In this institution high school graduates are required to take a course covering a period of one year, with three recitations per week. The first half year is devoted to physical geography, and the second half to general geography.

Normal school experience, covering a period of nearly twenty years, has shown the writer conclusively that what the high school graduate who is preparing to teach needs, is definite and thorough instruction in subject matter as well as in methods of teaching. No normal school student who is simply a high school graduate can carry a full course and acquire in one term a sufficient knowledge of North America, Europe or Asia to enable her to teach the geography of any one of those continents in a creditable manner. The argument that if the student has a knowledge of the method

to be employed, she will, as a teacher, work up the subject matter, is fallacious. As a matter of course, the average teacher grows much more rapidly in her knowledge of method than she does in her knowledge of subject matter. There are several reasons for this. Method is largely a matter of observation and common sense. To increase one's knowledge of geography, travel or study are necessary. The first entails a financial drain that teachers cannot well afford. The regular work of the day is so great a tax upon the teacher that few have the energy to do additional mental work. Under present conditions there is little incentive to study, as school authorities do not, as a rule, demand any preparation in geography beyond that now being furnished by the schools.

To point out a weakness in our educational scheme is of very little value unless a remedy be indicated. The remedy should apply to those who are now engaged in teaching, as well as to those who are to become teachers. As applied to geography, the remedy can be concisely, definitely and accurately stated. *Better preparation on the part of teachers is the only solution.*

Teachers who cannot afford to give up their positions in order to study, should be urged and encouraged by school authorities to attend summer schools, and to avail themselves of the instruction in geography there offered. Much could be done in Reading Circles, and even by the individual teacher working alone. Any of the following books will repay group or individual study:

Influences of Geographic Environment,
Ellen C. Semple, Henry Holt,
New York, 1911; $4.00.

Physiography (Advanced Course),
R. D. Salisbury, Henry Holt,
New York, 1907; $3.50.

North America, I. C. Russell, Appleton's,
New York,1904; $2.50.

Mathematical Geography, W. E. Johnson,
American Book Company,
New York, 1907; $1.00.

The Teaching of Geography, W. J. Sutherland, Scott, Foresman & Co.
Chicago, 1909; $1.25.

This list is, of course, suggestive rather than exhaustive.

To the end that those who enter the teaching profession five years hence may be more fully prepared to teach geography, normal schools should *require* of all of their students who have had high school training only, one year's work in the subject with daily recitations. While people continue to be certificated on the basis of having passed an examination, County and

City Boards of Education should see that the questions applying to geography furnish a real test of the candidates' knowledge of the subject. The writer has in his possession sets of questions recently submitted in cities in various parts of the United States. These show definitely that too much attention is still given to matters of location and distribution.

There is not a large city in the United States in which there are not supervisors of music, drawing and other subjects. School authorities have failed to recognize the need of expert supervision as applied to geography. This would at once elevate the standard of geography teaching throughout the land. Where now there are practically no requirements whatever, there would be, under supervision, very definite requirements, because the supervisor would understand the possibilities and would be able to criticise wisely. Through individual and group conferences, teachers would receive direct help for their daily work, and they would be inspired to secure a more thorough preparation.

The results obtained from the teaching of geography are not satisfactory. Mere fault finding will not improve matters. To say that the unsatisfactory results are due to the nature of the subject is a great mistake. They are due to lack of knowledge of the subject. Teachers cannot teach the things of which they are ignorant, and until such reforms as have been mentioned are brought about, it is idle to expect any considerable improvement in the teaching of geography.

THE RELATION OF SOME RECENT ENGINEERING PROBLEMS TO GEOGRAPHY

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The Life of Primitive Man

The accepted definition of Geography today is "The study of the earth in its relation to man," or "The Study of the earth as the home of man."

Man has three great physical needs: need of food (his greatest of all physical needs), need of clothing, and need of shelter. The earth furnishes all the materials necessary to supply the demands of his physical needs. The earth is also the theatre of man's activities which his needs call forth.

Primitive Man, as well as the lower animals, satisfied his great physical needs with materials unchanged from the hand of Nature. His food consisted of certain roots, bark, twigs, leaves, berries, nuts, worms, lizards, fishes, eggs, etc., all of which were eaten raw. He covered his body with

the bark of trees and later with the skins of animals. His shelter was a cave or a hollow tree or a hollow log. His wants did not exceed his needs. His own hands administered to his every want.

Primitive Man had no tools, no weapons. The use of fire was unknown. In common with the bird and beast there was nothing that was his very own except his *nest,* his *lair.*

Primitive Man discovered that he could strike a harder blow with a stone in his hand and that he could strike a still harder blow with a stone inserted in the split end of a stick. He discovered the use of the club. He found that he could reach timid animals by means of a long pole and, if the pole were pointed, that with it he could pierce their vital parts and thus secure such animals for food and clothing materials. Later he discovered that a sharp-pointed stone in the end of the pole increased the use of the pole as a tool or weapon. The invention of the bow and arrow insured him a larger supply for his needs,and increased his protection against fierce animals and fiercer enemies of his own kind.

Let us follow Primitive Man in one of his return trips from a nearby stream to his cave. He is carrying a number of fishes, one of which without his knowledge drops on a smoldering fire that had been kindled by lightning. Next day he retraces his steps and finds the fish that he had unwittingly dropped the day before. He follows his first impulse—the impulse to eat it. He finds the flavor and texture changed. The flavor is more palatable and the texture is more yielding to his teeth. But the fire has died out and he is unable to make another.

By accident he discovered later that two sticks rubbed together produced heat; and that continued rubbing produced greater heat. The instinct of curiosity led him to see how much heat could be produced by this process. Ignition at last resulted. Now Primitive Man became a cooking animal, a characteristic that differentiated him from all other animals.

Primitive Man by the use of fire could now roast and broil both fish and flesh, but he could not boil them. He had discovered that dried clay is both water-proof and fire-proof. He had already made receptacles of twigs, reeds, and grasses. Some of these he lined with a thick coating of clay. When these dried they were successfully used as cooking utensils. When the vegetable frame-work burned off, it left a diamond-shaped pattern on the outer surface of the vessel. Later other clay vessels were fashioned like the originals, not only in size and shape, but the diamond-shape pattern was reproduced on the outer surface—so strong was the instinct of imitation.

In the long struggle of human development it was discovered that spearheads made by different individuals varied in form, size, weight, and rock material: hence they varied in efficiency. It was also found out

that, try as hard as they might, all could not do equally well. Then as now one man in a group excelled. Therefore his spearheads were sought by all others of the group, and to satisfy this demand of his fellows, his time and energies were spent to the exclusion of securing materials to satisfy his own imperative needs. This led to the exchange of fishes, fruits, bark, and skins for spearheads. The same was true concerning bow-and-arrow making. The same was true concerning the shaping of skins to the human body, that greater comfort and convenience might be experienced by the wearer. Hence began the division of labor, the dawn of manufacture, and the exchange of commodities.

No people ever emerged from savagery until they had placed their food supply upon a permanent basis. So long as man depends upon the *natural* supply of food and shelter materials, just so long he must be a nomad, without the conveniences, the comforts, and the civilizing influences of a fixed dwelling place.

The great bulk of man's food and clothing materials comes from the plant world and the animal world. Man domesticated the sheep, goat, cow, horse and camel. These furnished him milk; from milk he made butter and cheese. Some of these animals furnished wool and hair for clothing and tent cloth. When slaughtered they gave him flesh for food, fats for fuel and light, bones for rude tools and utensils, and skins for clothing, rugs, and bedding. The domestication of animals placed man's food supply on a permanent basis only in part, and because only in part, man remained a nomad. In this condition he is still the creature of his environment and must go from place to place to find fresh pasturage, and often fresh streams, for his flocks and herds. He must also seek grains and fruits for himself.

In time man learned in his evolution from savagery that he could make two blades of grass grow where only one had grown before. He learned a similar fact regarding wheat, barley, and other grains; for all cultivated grains, as well as domesticated animals and man, have a wild ancestry. The cultivation of grasses and grains with the domestication of animals made it possible for man to have a fixed dwelling place. This made possible community life; government, schools, churches, hospitals, a higher development of manufactures, and the development of trade centers. Now man is no longer the creature of his environment but the creator; no longer its servant but its master.

The placing of man's food supply upon a permanent basis gave rise to two great industries, namely, agriculture and grazing. With every advance in agriculture there has been an advance in civilization. Agriculture is necessary for the establishment and growth of any nation. And that nation whose agricultural resources are practically inexhaustible, may reasonably expect to see centuries of increasing national prosperity.

The extent to which man *subdues the earth and has dominion over every living thing* determines the plane of his civilization.

So far we have taken a hasty glimpse of man during the millenniums of his evoution from savagery to civilization. The history of his evolution is a history of struggles. His advancement has been exceeding slow but nevertheless sure. What he has found out to his advantage has come from accident rather than from experiment deliberately planned and executed. Not until the nineteenth century has civilization advanced by leaps and bounds.

THE CHANGES OF THE MODERN PERIOD

Since the year of our Lord, 1800, candles and whale oil have in turn given place to gas, kerosene, and electricity. Gas, kerosene, and electricity have been substituted for wood and coal in the kitchen range. The open fire place and wood stove have been crowded out by the hot-air furnace, by steam, and hot-water. The nineteenth century has seen the sickle and grain-cradle displaced by the reaper, the harvester, and lastly by the combined harvester and thresher, by means of which the standing grain at sunrise is sacked at sunset.

The nineteenth century has also seen the introduction of the roller process, by means of which in 1901 the capacity of the Minneapolis mills was 80,000 barrels of flour per day; it has also seen the passing of the churn and the introduction of the separator. During the last century modern methods of refrigeration have been discovered and adopted; and by means of these methods our fresh meats are sent to foreign markets; "California sends grapes, pears, peaches, and apricots to the most distant home markets in competition with nearer sources of supply." Apples, the queen of fruits, by means of cold storage, hold sway from one harvest to the next. "Onions are delivered in prime condition from Spain to the United States, and tomatoes from Spain to Great Britain. Fresh grapes are sent in cold storage from Cape Colony and Australia to the mid-winter markets of Great Britain." The invention and perfection of rubber goods is not a century old. The modern use of steel has made it possible to build sky-scrapers to relieve the congested surface conditions of our great cities. Steel has led to the passing of the slow-going wooden ships and the coming of ocean greyhounds. Steel made possible the building of the Brooklyn bridge and the St. Louis bridge. The railroad, the trolley car, the telegraph, the ocean cable, the wireless, the X-ray, the telephone, the phonograph, the bicycle, and the automobile are products of the nineteenth century. A score of inventions have come into the home, notably the sewing machine and the typewriter.

By means of canals man has shortened sea routes, made seaports of river towns, cheapened freights, and reduced the time required for delivery

of goods. Canals have not only greatly affected commerce, but every other one of the great human industries. The Suez Canal, 101 miles long, has shortened the distance from Bombay to Southampton by 4800 nautical miles. The climate of India has always been favorable for wheat culture, but her wheat sent across the hot Indian Ocean and around Cape of Good Hope suffered deterioration, and could not compete with the wheat from Russia, France, and the United States. But when the Suez Canal was built India became great in wheat-exporting, and consequently the fourth wheat-producing country of the world. The Panama Canal will shorten the sea distance at least one-half from all North Atlantic ports to the Pacific ports of America.

The tunnel under the North River, enabling the Pennsylvania Railroad to land its passengers and freight in New York city without change has a profound influence on transportation and commerce. New York's subways have not relieved the congested conditions of travel to the extent it was hoped they would, due to the rapid increase of her population; but if the subways were closed today, the embarrassment that would be experienced can hardly be estimated.

Man has subdued in great measure the land and the sea, and now he is attempting the conquest of the air. Although aerial navigation is still in its experimental stage, men are prophesying that it will revolutionize military operations in times of war.

The nineteenth century has witnessed so many industrial discoveries, so many time-saving and labor-saving inventions, so many gigantic constructions, the growth of such great business corporations and labor organizations that one wonders what is left to be done in the twentieth century! There is much to be done to bring to greater perfection the gifts of the nineteenth century. And there may be greater discoveries, greater inventions, mightier products of engineering than are yet known. We have ceased to be surprised at anything produced by science or by art.

The twentieth century opened with a policy of internal expansion in our own country. Many have declared this policy to be the most paternal ever attempted. "On June 17, 1902, Congress enacted a law known as the National Reclamation Act. Briefly, this act provides that the money received from the sales of public lands in fourteen arid states and two territories should be used as a reclamation fund for the construction of works necessary to irrigate arid lands in those states and territories. As soon as any work is completed the owners of land benefited must begin to return the cost thereof, payments being made in ten annual installments without interest. The money so returned can be used over and over again in the construction of other works. To eliminate speculations and to put a stop to the greedy acquisition of large areas, it was further provided that no man could own more than 160 acres, under any of these works, and such

owner must actually reside upon and cultivate his land." The projects either completed or nearing completion will add 3,198,000 acres to the crop-producing area of our National Domain. Other projects under consideration will reclaim 3,270,000 acres more, making a grand total of 6,468,000 acres. This area is considerably more than one-fifth the area of New York State. It will make 40,425 farms of 160 acres each, or homes for over 40,000 families on farms. This large rural population will call for villages and towns to be located in their midst, as trade centers and home markets. Hence, it is reasonable to believe that these reclaimed lands will support 80,000 families on farms and in towns and villages.

Nor is this all. These irrigated lands are among the richest and most productive lands in the world. The enormous yields of grasses, grains, and fruits will call for the construction of many miles of railroad. The settlers of these regions will demand many miles of electric lines. And hundreds of minor industries will be called into existence. Thousands of laborers, skilled and unskilled, will be called to do the work. Fortunes on irrigated lands will be made in half a lifetime. The makers of these fortunes will retire to the towns, and other and younger men will take their places on the farms. Men can figure mathematically on the income from irrigated lands. In some irrigated regions, as the Yakima Valley in Washington, the apple orchards often yield 1470 boxes per acre, which sell for $1.25 per box, or $1737 per acre. Here $2000 per acre for orchard land is not an uncommon price.

It is predicted by our most thoughtful men who are in positions to know best, that our population will reach reach 200,000,000 in 1950, and 300,000,000 at the close of the present century. For fifty years we have relieved the overcrowding of great population centers of the Old World. We may do it for fifty years to come. But we shall need to bring "under the ditch" every acre of land that can possibly be brought under; for our farming lands are not only our glory but our salvation as a nation.

WHY IS GRAND RAPIDS?

By GRACE F. ELLIS,
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GRAND RAPIDS, Michigan, is located in the central western part of the state, thirty miles from Lake Michigan, just south of the big bend of Grand River. It is 156 miles from Chicago, by rail and boat, and 178 miles by the shortest all rail route.

Grand River here flows through a valley one and one-half miles in width, bounded on either side by lines of moraine which rise from one

hundred to one hundred fifty feet above the river level. The moraine on the west was the boundary of the Lake Michigan ice-lobe in the period when this part of the country was covered by a retreating glacier; similarly the eastern moraine was the boundary reached by the Saginaw ice-lobe. The water from the melting ice-fronts all along the river—so far as the river was in existence—poured into this valley between the hills and swept along in an immensely greater flood than occupies the river bed at the present time. For this reason the Grand flows in a valley disproportionate to the size of the river, and so leaves a wider margin of level land than would otherwise be found at the base of the hills for city building. Beyond the eastern terminal moraine over which the city has now climbed, lies a stretch of rolling ground moraine; and on the lake side of the western terminal moraine is the same belt of rolling ground moraine, giving place after a few miles to stretches of oak grubs, where Grand River deposited sand when Lake Michigan stood high against these hills, then the eastern margin of the glacial lake Chicago.

Long before the white man had any knowledge of the place it was occupied by the Indians; there was an Indian village on the west bank of the river; the rapids made it a place of portage, and after French missionaries had established a mission here, that astute French fur trader, Louis Campau, was licensed to trade with the Indians of Grand River valley as early as 1827. In that year was built the first house occupied by white men, but not till 1833 did families arrive to establish homes. At this time all western Michigan was a wilderness of forest, the government had hardly finished a survey, and troubles over Indian titles were scarcely done away with.

The opening of the Erie Canal furnished a means of transportation from the east, and pioneers from New England and New York state came by canal boat to Buffalo, across Lake Erie to Detroit, and then through the woods to find a home in the wilderness.

Settlement and the increasing demands of agriculture worked havoc with the fur product, and gradually the fur-bearers, and the Indian fur-gathers disappeared together, and the rapids of the Grand which had so far been only a stopping place for canoes, became the location of the earliest industries of the pioneer settlement, the saw-mill, the grist-mill and the woolen-mill.

Logs to supply the first saw-mills which lined the banks of the river, were floated down stream from the virgin forest all along it, and the river was choked with them. Stewart Edward White tells the story of one "drive" in Grand River in *The River Boss,* one of the *Blazed Trail Stories.*

So thoroughly were the banks of the Grand and its tributaries denuded of their forest covering that the stream became subject to disast-

rous floods; this, together with the encroachment on the river-bed by buildings, has made it necessary for the city to spend a million dollars in "scalping" the river bed, i. e. taking out the limestone rock to deepen it; and to provide extensive flood walls on the west side.

The foundry, the machine shop and the furniture factory followed in the wake of the saw-mill; lumber was first manufactured into furniture in 1848. As the supply grew scarcer, more attention was paid to developing it into paying forms; and so was modestly laid the foundation of an industry employing today over six thousand six hundred persons, and turning out yearly a product worth nine and a half millions of dollars.

In the early days the stream of lumber was outward bound. Now the current is reversed and every year the amount brought in increases. Michigan forests still furnish hard maple, hemlock, ash, and elm, and beech, birch and maple are all supplied from the surrounding states; while oak, cypress, yellow pine, chestnut and "gum" come from the southern states. For the finest grades of furniture, mahogany is brought from Central Africa by way of Liverpool; Circassion walnut all the way from the Caucasus and Hungary. The city factories make the finest church, school, theatre and lodge furniture in the world, and supply a great share of the American demand.

The furniture factory has of late years given rise to another industry, and the furniture exhibition twice a year attracts buyers from all over the country. Several immense buildings display the furniture sent from factories from all over the United States during the exhibitions and store it for sale during the remainder of the year. The January and July furniture sales are a feature of business in Grand Rapids. The growth of this industry attracted workmen from the old world, and the first settlers from the east opened a way for a stream of foreign-born men and women, whose descendants in many cases are today the foremost citizens. With increasing settlement came expansion of industries, the gypsum industry, one of the oldest in the city, at first only supplying land plaster for use on the fields, has now an international reputation for plaster wall finishes. The grist-mill was the forerunner of the flour mills, which today grind $4,000,000 worth of flour annually.

Grand Rapids was the logical center for trade and transportation in western Michigan, long before railways or even stage lines, were ever dreamed of, when merchandise was carried on sledges, by pack animals, or in canoes. The Grand Trunk, then known as the Detroit, Grand Haven and Milwaukee, was the first railroad to reach Grand Rapids, when roads north and west followed; each mile of new track brought in business and justified the wisdom of Indians and fur-traders who had selected it as the strategic point of trade in the western part of the southern penin-

sula. The first railroad reached Grand Rapids in 1858. Today Grand Rapids is a center from which steam lines radiate in eleven different directions with more than forty trains arriving daily. In addition there are two interurbans with more projected. Grand Rapids owed its start in manufacturing to the fall of Grand River, which furnished power for factories; the same fall gave the city its first hydro-electric power; today this power is also furnished by the Muskegon, Au Sable, and Kalamazoo, and these together with the Grand contribute to its industrial growth and prosperity. The development of hydro-electric power has only just begun. There are thousands of available horse power waiting development within economical reach of Grand Rapids industries. By the terms of the franchise granted the power company this city has lower maximum rates than almost any other city in the country except Niagara Falls.

The present day industries of the city are greatly diversified; it makes ninety-five per cent of the carpet sweepers of the world, leads in gypsum products, and sticky fly paper, refrigerators, store fixtures and band instruments. Much attention is paid to fine designing and the making of catalogs. Here are made pearl buttons from the shells of Grand River clams; automobiles, perfumery, gas engines, elevators pianos shoes, cigars, fireless cookers, tpyewriters for the world, candy by the ton, bricks by the carload, and a long list of other goods that help make the world's commerce. The census of 1904 gives Grand Rapids 389 industries capitalized at more than $25,0000,000, employing fifteen thousand seven hundred workmen with wages amounting to over seven millions of dollars. Unclassified industries employ some thirty-five hundred others, and yearly products of the 525 factories are valued at over $53,000,000.

Farming under glass, and home grown "forced lettuce," has given Grand Rapids a unique position in the winter markets. Southern vegetables—tomatoes, radishes and cucumbers—have to meet so much competition that they are of secondary importance.

Michigan's forests have already disappeared, and her famous mines show signs of exhaustion, but she has one asset which time and use cannot deteriorate; that is the milder climate of the strip along the west shore which constitutes the Michigan Fruit Belt. Of all this stretch of productive country Grand Rapids is the chief market city and supply depot. Sixty thousand bushels of peaches have been shipped from Grand Rapids in a single day. The fruit industry is on the increase and with it will increase the business it brings the city.

Industrially Grand Rapids has so long been called the Furniture City that its other industries are overshadowed, but its population of 112,570 is engaged in a sufficient variety of enterprises to make sure its future growth and development.

COMMERCIAL GEOGRAPHY AS A SECONDARY SCHOOL STUDY*

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THE growing demand for commercial geography is a logical outcome of the growth of commercial courses. Why is there a growth in commercial courses? Doubtless because the age is dominated by commercial ideals. Just as we had in the past an Age of Faith, an Age of Feudalism, an Age of Chivalry, so we now have an Age of Business. The best ability and greatest energy of our period is being, to a noteworthy extent, attracted into the field of business. The dominant nations are seeking in every possible way to extend their commercial domains,—to expand commercially. The gravest of our national problems are in the field of industry and commerce. A very considerable proportion of our school graduates are looking forward to business careers. Our people are extensive readers of newspapers, magazines and books. All of these facts tend to draw the attention of people toward matters of commerce and of industry and to make them desire to know about the commercial affairs of the great nations of the earth, about their resources, their relative strength, and other similar matters. So long as commercial interests dominate our people, so long will there be a demand for studies which make people intelligent about commercial matters. This is one reason why commercial geography is growing in favor.

It must be said, however, that educators generally, including geographers themselves, have not looked with high favor upon commercial geography. Somewhat reluctantly do geographers recommend it. The reasons are easily discovered. Commercial geography includes so many statistical facts that, in the hands of the untrained teachers the study is ever in danger of degenerating into a memorizing by pupils of many disconnected and disassociated facts. The subject matter of commercial geography lends itself more readily to mere memorizing than does that of physical geography; unless carefully safe-guarded, the study may become scarcely more than a momentary committing to memory of many facts, without much thought of their underlying causes or of their inter-relations.

A study which is entitled to a place in our schools must do for the pupil two things, at least. It must train him in good mental habits and it must give him a body of knowledge which in some useful way functions in the affairs of life. There is no denying that the subject matter of commercial geography, wisely selected, is worth teaching and worth knowing. The question is, can the study be so taught that it requires pupils constantly to use other faculties than the memory? Can it be so handled that pupils will observe, reason, compare, judge, and perform other mental acts which they need to perform if they are to secure a well-rounded mental development? Because commercial geography is not generally so taught that it does

*Abridged from an address delivered before the Commercial Studies section of the National Education Association, Chicago, July 11, 1912.

accomplish these ends, educators have looked askance at it.

The questions before those of us who believe the study can be made a valuable and efficient educational instrument are: What shall we do to make it such an instrument of education? How can the tendency to memorize without thinking be overcomme? How can the study be rationalized?

At the outset, we must recognize that the main aim is not to learn a multitude of ever changing facts about exports, imports, manufactures, and the like. It does not matter much whether France is the third or the fourth country in the production of wheat, or whether or not Java exceeds Cuba in the production of cane sugar. It does not matter much whether Lille makes more lace than Bern, or less. It does not matter much whether Japan produces more rice than India, or less. Such knowledge is of comparatively little use, for a Statistical Abstract or a Statesman's Yearbook or a text book can supply this information when wanted. As a rule, it does not pay to burden the memory with very much of this kind of information.

Herein lies one of the faults of commercial geography; it tempts the teacher to lay emphasis upon such questions as, What city of France produces the most lace? or, What city of England manufactures the greatest number of pocket-knives? or, Where in Ireland is the most linen made? I do not intimate that such questions must be excluded. A certain number of such questions have a legitimate place. The criticism is that such questions are likely to occupy too prominent a place in the study of commercial geography. There are other lines of inquiry which yield more valuable returns.

To me it seems that one of the real purposes in the study of commercial geography is to get an intelligent understanding of the basal reasons which make a country a great producer of certain commodities, or a great exporter or importer or carrier. These reasons may be climatic, or historical, or racial, or otherwise; and this leads me to the point which I think is sometimes overlooked—that commercial geography is interwoven closely with elementary economics, with the facts of political geography, with facts of history, as well as with facts of climate, physiography and geographical situation. A pupil well trained in commercial geography is one who understands, for example, not only that Great Britain produces and supplies cotton goods in great quantities to the world, but who also understands why. It is the pupil who understands that, on one hand, the resources, climate, coastline, soil, and other geographical factors are important in directing a nation's activities, and on the other, that racial traits and inheritances, stage of civilization and character of government also are factors of consequence.

A commercial nation is not made simply by the possession of great resources, or a favorable geographical position, unless the people who occupy

this land have the abilities and the energy to develop and utilize what nature has provided them. Doubtless the growth of Great Britain, Germany, and the United States as commercial nations has a close and immediate relation to the resources of coal and iron which these nations possess; but it is also true that Spain, Cuba, and Brazil have vast resources of iron; and China of coal, and yet these countries are not industrial countries. There is something in the people and institutions of the latter countries which unfits them for the utilization of their resources, and on the other hand there is something in the character of the German, the Englishman, and the American which leads him to discover, to develop, to utilize the resources and forces of nature about him.

The effective teaching of commercial geography requires that the teacher himself appreciate in some degree the various factors which are potent in the commercial life of a people. Frequently the best way to get at the underlying causes which make for or against commercial development is to select two countries which are commercial rivals and then compare and contrast them. The comparison of France and Germany with regard to climate, resources of soil and minerals, favorableness of geographical position, character of coastline, racial traits, education, and government, will help to impress the reasons why one of these countries surpasses the other in industry and commerce. A comparative study of Brazil and Argentina, of Canada and Mexico, of Norway and Sweden, of China and Japan, of Australia and South Africa, is a very profitable exercise. The aim is so to attack the subject that pupils must think, must exercise judgment, must make comparisons, must balance an advantage or disadvantage in one country over against corresponding advantage or disadvantage in the other country. As a method of stimulating pupils to make this comparison in my own classes, debates are held; in these three or four persons on a side present arguments for and against such a resolution as this, *Resolved,* That France possesses natural advantages for international commerce equal to those of Germany. These debates never fail to create interest and to lead the more thoughtful pupils to a fuller appreciation of all the factors which make for commercial growth.

Another device has been borrowed from the Agricultural College. One of the activities in which students of agriculture engage is the judging of farm animals, the judging of the quality of butter, of cheese, or of seed corn. Sometimes it is conducted in this way: a perfect dairy cow, for example, is assumed to deserve a score of 1000. Then each of the different important qualities which make up the perfect animal are weighted. The cow which is to be judged is inspected by the student, and each of the different points enumerated on his score card is considered, with respect to that animal, and a numerical value is given to each point, and finally the sum of all these points is obtained. This sum constitutes the score given

to that animal, say 800 or 825 out of a possible 1000. In a similar way the students in commercial geography are asked to score or judge various commercial nations. Possibly our scheme of marking is not as good as might be devised for it is still in the experimental stage; but we conduct the exercise as follows: the ideal commercial nation is arbitrarily given 1000 points. It is not assumed that an ideal commercial nation actually exists. We have, however, generally given our own country about the highest score received by any nation, although it is not given the full 1000 points. The thousand points are divided as follows:

(1) Climate in all its bearings combined with area receives 350 points.

(2) Natural resources receive 300 points.

(3) Natural advantages for carrying on international commerce including physiography, boundaries, coastline, situation with regard to other commercial nations, receive 150 points.

(4) The people, and the intelligence with which they utilize their advantages and resources, receive 200 points.

Doubtless our weighting of these points is open to objection, but it serves our purpose and seems to work well. The exercise is conducted in this way. A country, for example Germany, which has been previously studied, is taken up and the members of the class are called upon to work out a score for Germany. The climate of Germany in all its bearings is considered. Germany is compared with a country otherwise like it, but having an ideal climate, that is, ideal in every particular. The ideal country would receive 350 points; Germany is given such a part of that number as the student believes it to be entitled to. That is, he takes into consideration the area of Germany and then thinks over the various elements in the climate of Germany, both favorable and unfavorable, and judges how nearly Germany approaches the ideal in area and climate. Then the same is done with reference to natural resources, and Germany is compared with the ideal country in these particulars; the ideal country of course must have a very large proportion of its area made up of productive soil, yet it must have some mountains, for metallic minerals are seldom found extensively except in mountainous regions. Other resources are also considered, as fisheries, water power, and natural waterways. When the pupil has formed his mental concept of the ideal country, he compares Germany with it and gives Germany such a proportion of the 300 as he thinks it deserves. In the same way the remaining two points are handled, and the total score is computed. The students are then asked to defend the score which they have given to the country on each of these points, that is, to give in some detail the reasons why they have given a high or a low or a medium score.

The aim of it all is that the pupils may be compelled to digest the information which they have gathered, to judge, to compare, and to exercise reason. This device is used only now and then; it occupies only a small

fraction of the time devoted to commercial geography. It forms a review or summarizing exercise rather than the initial study of any country.

The rationalizing of commercial geography may be further accomplished by emphasizing such questions as the following:

(1) In your judgment, has Canada or Argentina the more promising future as an industrial and commercial nation? Give reasons for your answer.

(2) Forecast the future development of Australia. Along what lines is that development most likely to take place ? Give your reasons.

(3 Compare the resources of Brazil with those of Argentina; also compare the ability and efficiency with which the people of these two countries are developing their resources. How do you account for the difference?

(4) Contrast the commercial activities of Japan and China in the last half century. How do you account for the difference?

(5) Compare the tariff policy of Germany with that of Great Britain. To what extent do you think each country is wise in the policy which it has adopted, and why?

(6) What are your best arguments for or against reciprocity between Canada and the United States?

(7) Why are coal deposits more valuable to a country than gold deposits?

Such questions imply some maturity of thinking and probably a few of them are too difficult for consideration in high school classes. They will, however, suggest lines of inquiry which may be used in modified form in any class. The purpose is ever to get pupils to think, to digest the information which they have acquired, and thus to make their knowledge dynamic rather than merely static.

Questions which ask merely How much or How many are likely to be over-emphasized in commercial geography; while questions which ask Why. are likely to be neglected because they are more difficult and because they do not admit of definite answers. Lest I be misunderstood permit me to repeat that it is not advisable wholly to omit the customary type of questions such as "What countries are the leading producers of wheat or of gold?" or "What is the character of the export trade of Great Britain, and of the import trade?" or "Where does the world get its supply of rubber, or cane sugar, or cacao or cork?" All of these questions are profitable, providing they do not constitute an undue proportion of the whole, and providing those questions which demand thinking rather than memorizing, are freely introduced into the class, work.

Besides these fundamental considerations, there are certain secondary matters which I desire to present, without elaborating. Commercial geography offers the teacher an opportunity to give pupils certain incidental forms

of instruction and training which will prove exceedingly valuable in after years. Dealing, as the study does, with many statistics, it is desirable that pupils learn some method of presenting them which shall impress the facts which they contain. More and more, men are employing curves and diagrams by means of which statistical matters are presented graphically. Graphics appeal at once to the eye; they make an impression which is likely to remain, and by means of them one may present many facts in small space. I strongly recommend that you give your pupils frequent opportunity to represent significant statistical matters by curves and by other forms of diagrams. Such work appeals to students and, having once learned the practical value of graphic representation, they have at their disposal a most effective method of presenting statistical facts.

Government publications freely employ these graphic methods. Magazines and textbooks are using them. Scientific men are employing curves to present graphically the ideas which the mind could scarcely grasp if not presented in this way. The use of outline maps or base maps upon which pupils plot facts involving both quantities and distribution is a profitable exercise; such for example as the distribution of the coal areas of the United States, or by circles, representing the relative production of wheat or corn or cotton in the different states as Brigham has done in his *Commercial Geography.*

While the textbook will supply the larger part of the subject matter, your pupils should learn during the course how to find and where to find additional information pertaining to industry and commerce. They ought to become familiar with the most useful of our government publications, to learn how to get them and how to use them. Your reference shelf should contain both the regular and special publications of the Census Bureau, not simply the reports of the Decennial Census but the serial reports which are being issued nearly every month and which often contain the newest information about some industry. Pupils should know of the existence of the Statistical Abstract, of the publications of the Bureau of Manufactures; of the various bureaus of the Department of Agriculture; of the Department of Commerce and Labor; of the Commissioner of Corporations; of the Geological Survey; of the Reclamation Service, and others of the government bulletins which are issued periodically. Unless one has systematically sought to get from the government its wealth of publications in any line, he does not realize what a storehouse of material is at his command simply for the asking. It may take some correspondence and time to acquaint one's self with what is available, but it is time and money well spent. Pupils who occasionally use these publications derive as much advantage from learning of their existence, as from the actual information gained at the time.

The teaching of commercial geography should also form in the pupils the habit of using the encyclopedia and atlas. Maps should be used freely

and systematically. Locational geography should not be neglected. All of these things can not be done by one class. Each teacher will decide what ones of these incidental activities he will emphasize. It can not be doubted that a pupil will get more from commercial geography through such means than through the more intensive study of a textbook, even though the latter method might better fit him to pass examinations.

I wish also to recommend that you interest your pupils in doing a certain amount of voluntary outside reading of a semi-popular character. The World's Work, for example, publishes excellent articles which pupils in commercial geography will enjoy. Many supplementary books exist; such as the series entitled *Great American Industries,* published by Flannagan of Chicago, or a more scholarly series on *The Story of Sugar, The Story of Oil, The Story of Gold,* and others, published by the Appletons, or books like McMurry's *Larger Types of American Geography,* published by the Macmillans, or Brigham's little book *From Trail to Railway Through the Appalachians,* published by Ginn. These are only a few of the interesting books which almost anyone would enjoy reading.

These latter recommendations I have called incidental matters, and yet if sanely handled they may prove to be of as great benefit to your pupils as the more serious work of the class. All of us know from our college experience that those courses which taught us where to find material, how to find it, and how to use it, were on the whole more valuable than the courses which at the time gave us pre-digested information. The same methods will not necessarily prove equally successful in the secondary schools, but the efficiency of those methods in the university suggest that with wise modification they may be effective in the secondary school.

If commercial geography can be so taught that pupils are required to think, reason, judge, and compare, to use reference materials, if they are trained in presenting statistical matters graphically, learn the value of the use of base maps for showing distributions, and gain an interest in international affairs, then commercial geography will commend itself to educators everywhere, and it will win a permanent place among the studies of the secondary school.

THE WORLD'S GREAT RIVERS—THE GANGES

By SUMNER W. CUSHING,
State Normal School, Salem, Mass.

IF size were the measure of greatness for rivers the Ganges would rank below the Yukon, for though its basin is equal to that of the Yukon, the river is five hundred miles shorter. Since greatness of rivers, geographical-

ly, depends upon their usefulness to mankind and the number of people influenced, the Ganges ranks high.

The river has built up the great plain that comprises roughly two administrative divisions of India, Bengal and the United Provinces. Its place as a geographic factor is indicated by the fact that although these provinces contain only 300,000 square miles, an area considerably less than that of Texas and Louisiana they are peopled by over one hundred and thirty millions, a greater number than is contained in the whole of North America combined with the largest and most populous countries of South America---Brazil and Argentina. Although almost entirely agricultural, this section of India has a density of population greater than that of Massachusetts, our most exclusively industrial and most densely populated state, with the exception of Rhode Island.

These people look to the river as the giver of food; for the Ganges irrigates their fields, and at the same time fertilizes them with abundant silt. It makes two and sometimes three crops grow where little or nothing grew before. Its gentle gradient and that of the tributaries for over a thousand miles from the mouth has encouraged transportation from earliest times from the Bay of Bengal to the northwest. The Gigantic plain has had an intensely active life ever since the agricultural stage was reached by its people, and the heart of that life has been the river. No wonder it has become sacred to them; no wonder its power seems to transcend the realm of the material.

The most famous cities of India have developed at critical points on the banks of the Ganges. The confluence of a tributary with the main river forms such a point. Benares, the Mecca of the Hindus, is so placed and derives its name from the tributary. Allahabad is at the junction of the Jumna with the Ganges; its Hindu name means *Confluence.* Cawnpore, of awful mutiny fame, owes its position to a narrowing of the river at its contact with the valley slope, so making an easy fording and bridging place. Delhi, the ancient and newest capital, is on the Jumna, where a ridge of the old land commands its course. Agra, the home of "the world's most beautiful buildings," the Taj Mahal is at the tangent of an outer curve of the Jumna, with the terrace slope of the Gangetic plain. And Calcutta, the made-to-order commercial city, the one-time capital, has logically become the first city of Southern Asia, because of its wonderfully productive hinterland and its position on the Hoogly, a distributary on the Ganges.

Over ninety-three per cent. of the people live in villages, the average of which contains about three hundred and fifty. So, the typical view which the traveller gets of this vast plain is an almost unending succession of fields of rice, cotton, pulses, millets, and other cereals, but mostly rice, interrupted by groves of palms and banyans that shield villages from the

sun; by thin and wide spaced lines of roads, river, and irrigation canals; and still more rarely by the iron road along whose course is a narrow tract, which alone has felt the throb of an out side world. Coming into this realm from almost any other part of India, the traveller is struck by the air of prosperity that is about the grass-thatched homes, in the fields, and on the faces of the classically clothed inhabitants. They seem to be assured that Mother Ganges will continue to touch the crops with her magic wand.

The Ganges has physiographic distinctions as well as geographic. Although it and many of its tributaries have glacial sources, it flows through one of the hottest inhabited areas known, where an approach to one hundred and twenty degrees Fahrenheit as a maximum, is not uncommon in May. It takes the principal part in draining the highest of the world's mountain ranges. Its maximum volume at four hundred miles from the sea is greater than that of the Mississippi at the end of its course.

As the Himalaya Mountains dominate physicaly all of Peninsular India, so does the plain of the Ganges, at their feet, dominate now, as it has throughout the past, the rest of India in religion, in politics, and in culture.

NOTES ON ECONOMIC GEOGRAPHY

By EDWARD VAN DYKE ROBINSON,
University of Minnesota, Minneapolis

SOUTH AMERICA

AFTER many delays and premature reports, railroad connection has finally been established between Rio de Janeiro and Montevideo and also between Ascuncion and Buenos Ayres. Plans are under way for a more direct connection between Rio de Janeiro and Buenos Ayres than that afforded by the route through Uruguay. The financial backers of these important railway extensions are found in France and the United States. Under present conditions it does not appear that any great volume of traffic can be carried by rail between Rio de Janeiro and either Montevideo or Buenos Ayres as the ocean voyage is not only cheaper but quicker. Another important railway project which has considerable backing is called the Trans-Paraguayan. This is backed by Brazilian capital, the idea being to divert the traffic of Paraguay from the river and railroad leading to Buenos Ayres eastward to some Brazilian port, possibly Sao Francisco. Actual construction has been undertaken. The route follows the Juaraga to its headwaters then cuts across to the Rio Negro. Most of the country is

thinly peopled and pioneer conditions of life prevail. Near Hansa, the present terminal of the line, there is an an extensive Germany colony. The route has been divided into three sections, the distances being from Sao Francisco to Uniao, 248 miles; Uniao to Iguassu Falls, 373 miles; Iguassu Falls to Ascuncion, 248 miles. The grades on the route are said to average of 1½ per cent., several tunnels being used to avoid high levels. The port of Sao Francisco is preferred as being one of the best in South America. Next to Rio de Janeiro and Santos it is the best in Brazil. The climate on the other hand is hot and somewhat unhealthful owing to the marshy character of the surrounding country. It is interesting to note that most of these railway enterprises are backed by Americans, the Brazilian Railway company being chartered in the State of Maine.

In January, 1910, the smelting of pig iron was begun at Corral, Chile. A rolling mill is also under construction at the same place. The ore is brought from near Coquimbo, some six hundred miles north. Ore is also found in the interior, at no great distance from Corral, but transportation is too expensive. The advantage which Corral has is the presence of coal in considerable quantities.

The tunnel through the Andes connecting Chile with Argentine was completed in April, 1910, and the service on the line has been fairly regular since that date. The grades, however, are so heavy in places that comparativly little freight is being hauled, the chief business being passenger traffic. The governments of Chile and Argentine have now agreed upon another railway some four hundred miles north of the present line. The road is to be of the same gauge all the way, thus avoiding the transfer of freight now necessary on the existing road. It is claimed that this road would require a tunnel of only 1640 feet and that only thirty-six miles of road would be necessary on the Chilean side to connect it with the Longitudinal Railway and the line to Port Caldero. Two other transcontinental railways are also projected south of the existing line. One of these is expected to reach San Carlos de Bariloche, on Lake Nahuel Huapi, by January, 1912. From this point it is only seventy miles to Puerto Montt, the southern terminus of the Chilean railway system. The Great Southern Railway System of Argentine has done much work on its Neuquen extension and it has only one hundred and seventy miles to build in order to connect with the Chilean railways.

NEW ZEALAND

Kauri Gum has been used chiefly for the manufacture of varnish, but the price has now advanced to the point where cheaper substitutes are called into use. It is now going into the manufacture of linoleum in Europe rather than varnish in America. Recently Chinawood oil, extracted from the nuts of a tree called *Aleurites Vernica*, has been used

as a basis for varnish in lieu of kauri gum. Soya-bean oil has also come into use in the United States for the same purpose. These substitutes are causing considerable depression in the city of Auckland, whose present prosperity was due chiefly to the trade in kauri gum. The fossil gum is obtained from the peninsula north of Auckland, where forests have been buried by volcanic eruptions and other changes of level.

In New Zealand the bulk of the sheep runs are within seventy-five miles of the coast, and it it possible to drive stock to a railway station or seaport for shipment. As a result the mutton type of sheep prevails. Also in remote districts, especially in the high lands, there are some large flocks of merino sheep. The climate is such that sheep seldom need to be housed in winter and diseases are seldom serious. For both these reasons the sheep industry has developed to large proportions since the introduction of refrigerator ships for the shipment of fresh meat to London.

Next to sheep, the dairying industry is the greatest source of prosperity in New Zealand. Owing to the high margin of cultivation, that is the high returns that can be obtained by the man who takes up land, the wages are high in New Zealand. In order to economize on the wage bill, milking machines have been generally introduced. More than any other factor they have made dairying the most successful occupation that the small land owners can carry on. There are said to be sixteen different types of milking machines on the market, all made either in New Zealand or in Australia. The dairying center of the North Island is New Plymouth, which is situated on the sea coast, near Mount Egmont. This mountain is 8000 feet high, and from it flows a number of rapid streams, furnishing water power for use in the butter and cheese factories. Most of the dairy establishments are co-operative, being owned by the farmers who supply the milk. The products of the dairying industry are subject to much governmental regulation. There is a compulsory system of grading dairy products for export. This system has recently been imitated in Australia. The main feature of this system is the establishment of certain exporting ports at which there is a government cold storage plant, in charge of an official grader. The butter intended for export must pass through these stores, where it is graded, marked and frozen. Cheese is likewise graded and marked at port. The dairies manufacturing this butter and cheese for export are classified and registered and the registry number of each dairy must appear on each package exported. This affords a ready means of identification and the placing of blame in case the article is not up to standard.

SOME GEOGRAPHICAL DON'TS FOR GRADE TEACHERS

1. Don't try to teach too many facts. It is a common mistake and is responsible for some of the bad results of our geography teaching.
2. Don't neglect reviews of *important* facts. After working hard to teach them to pupils, it's a pity to let them be forgotten for want of occasional reviewing.
3. Don't fail to have your wall map before the class whenever it can possibly be of use, and that is nearly always.
4. Don't neglect current events of a geographical character. They connect the classroom work with the active world and dignify the study of geography in pupils' esteem.
5. Don't fail to ask "Why?" frequently. This is the key word of modern geography.
6. Don't forget to teach home geography in every grade. Make your local geography and local industries a means of illustrating general truths and principles.
7. Don't fail to keep posted on the progress of important events in foreign lands, and don't fail to keep your class in touch with them.
8. Don't be satisfied unless your class in geography likes the study about the best of all their classes. The first step is to like it yourself, which means that you must keep studying the subject until you are full of it and full of enthusiasm for it.
9. If you teach history also, don't fail to make use of geography in that subject. They are good companions.
10. Don't forget that good pictures and good maps are to be *studied,* not just looked at. They are as much a part of your text as the printed matter.
11. Don't fail to take an occasional field trip with your class. Make it voluntary. Invite your pupils to go as your guests. Make the trip an event.
12. Don't blame your text book. It may not be the best on the market, but an efficient teacher can get results in spite of a poor text book. Besides, it's partly a matter of opinion what book is good and what one is poor.
13. Don't wholly omit map drawing. It may be old fashioned, but that doesn't condemn it.
14. Don't allow the study of geography to be merely a memorizing of facts. See to it that pupils gain some understanding of reasons and relations.

R. H. W.

OUTLINE OF A COURSE IN PHYSICAL GEOGRAPHY

Adopted for the John Marshall High School, Richmond, Va.

Recitation—Three periods of forty minutes each per week for forty weeks.

Laboratory—Two double periods of eighty minutes each per week for forty weeks.

Field and lantern work as often as the work demands.

Current topics bearing on the work are reviewed thoroughly, and clippings from papers and magazines are discussed and filed.

Special attention to industrial and commercial relations.

The laboratory is supplied with the necessary appliances for modeling, drawing, showing erosional processes, etc. A combined lantern and projectoscope is used to advantage in showing lantern slides, pictures, folders, cards, etc.

Topographic maps of the type regions of the United States are furnished in sets of thirty each.

The equipment also includes meteorological instruments, season apparatus, maps, globes, relief models, charts, government bulletins. The mineral cabinet is well supplied with specimens of rocks and minerals, many of which were collected by the pupils.

THE LITHOSPHERE

I. Relief Features
   1. Mountains
   2. Volcanoes
   3. Plains
   4. Plateaus

II. Work of the Atmosphere
III. Work of Ground-Water
IV. Work of Running Water
V. Glaciers and Deserts
VI. Lakes and Swamps
VII. Shore Lines
VIII. Crustal Movements

THE EARTH AS A PLANET

I. Origin
II. Form
III. Structure

IV. Motions
V. Latitude and Longitude
VI. Localization of Places
VII. Mean Solar Time

THE ATMOSPHERE

I. General Conception of the Atmosphere
II. Composition
    1. Uses and sources of the Principal Gases. (Simple experiments to illustrate these).
III. Temperature of the Air
IV. Moisture of the Air
V. Atmospheric Pressure
VI. General Circulation
VII. Distribution of Rainfall
VIII. Weather Maps
IX. Climate

THE OCEAN

I. Area
II. Characteristics
III. Functions
IV. Exploration
V. Depth
VI. Temperature
VII. Movements of Ocean Waters
VIII. The Ocean Floor
IX. Life in the Ocean.

LABORATORY WORK

Each pupil is required to keep a note book with a carefully written record of all work.

The object of this work is to awaken interest and to stimulate power of observation and thought along right lines.

I. Construction of an Ellipse (to scale)
    1. Position of the Earth at perihelion and aphelion
    2. Circle of Illumination, etc.
II. Phases of the Moon
III. Construction of the Northern and Eastern Hemispheres
IV. Map Projection
V. A Study and Classification of:
    1. Rocks
    2. Minerals

3. Soils.

As far as possible, the pupils bring their own specimens. They are encouraged to make collections and ask questions at all times. A trip is taken to study the state geologic exhibit.

VI. Contours:

1. Models made by pupil (plasticene).
2. Construction of contours.
3. Interpretation and transfer of contours from models, pupil's and teacher's.
4. Profiles (transverse and longitudinal).

VII. Topographic Maps (U. S. G. S.)

1. The home region is interpreted and proved by the child's own observation.
2. The government Contour Maps are used for location of the physiographic divisions of the United States.
3. Type topographic sheets are used in connection with each region as studied.
4. Profiles made to scale—to interpret the topography of the region.
5. Cultural features.

VIII. Modelling of Land Forms

IX. Study of Weather Maps (blank U. S. maps used)

1. Making and interpretation
2. Progress of Storms
3. Observations made and recorded each day for a month

X. Isothermal Charts Constructed

1. Of the World for January and July
2. Leading questions asked to bring out the main points of difference.

XI. Drainage

1. Studied in the field and from the delta table
2. Profiles (transverse and longitudinal) constructed of young, mature, and old streams
These are made to scale.

LANTERN WORK

Slides, postcards, pictures from magazines, etc., are used in connection with all phases of the work.

FIELD WORK

Trips are conducted by the instructor to convenient points which can be reached by the trolley. These are made as often as the work demands.

The pupils are required to carry note books, record observations, and hand in written report of the trip within a week after the excursion.

Subjects:

1. Forms of relief
2. Structure
3. Erosional processes
4. Soil formation
5. Cultural value of the above
6. Weather conditions.

A trip is always made to the Weather Bureau to study the instruments and listen to the explanations of those in charge. This is made possible by the courteous co-operation of the Director of the Bureau, who also gives the pupils an illustrated lecture in the lecture room of the station.

LOUISE C. KELLY.

THE REAL CRUSOE OF CRUSOE'S ISLAND

THE Island of Juan Fernandez, or Mas a Tierra, is almost universally associated with Robinson Crusoe, and Crusoe is commonly regarded as a creationof de Foe. But Crusoe, or Kreutznaer, was not a myth, and he never set foot on Juan Fernandez Island. Alexander Selkirk, the mutinous Scotch sailor, whose enforced stay on the island, was not the hero of de Foe's story, although he was known to De Foe and undoubtedly the latter profited by the relation of Selkirk's adventures.

A study of the story can lead but to one conclusion: The wrecking of the ship of which Kreutznaer was the super-cargo, could not have occurred on the Pacific coast of South America; on the contrary all the descriptive narrative points to the Spanish main, the latitude and longitude indicating the nearby coast of Guiana or Brazil. Moreover, the description of the sailing directions and the locality of the wreck are too minute to be the narration of fiction. A landsman who had never made a voyage along the Spanish main could not guess the conditions and happenings as they are related; they were actual facts. The wreck as related in the story was a real wreck, and it occurred in the vicinity of the Windward Islands. According to the narrative, when the ship was badly strained by the Carribbean Sea cyclone, the master advised going southeastward to the Brazil coast.

By using the ordinary storm chart, or "card", for that locality one will see that the master's opinion was correct, for this would have been the "path of safety". Crusoe, however, advised standing off for Barbados; and being the owner's agent, his orders were followed. Now the card will show

that this course would carry the ship back into the eye of the cyclone, and this seems to be exactly the thing that happened; for Crusoe writes that they were overtaken by a second storm—the one that drove the ship on the shoal.

Crusoe's description of the island—its climate, seasons, flora and fauna —all apply minutely to the islands off the northeast coast of South America. It does not correspond at all to Juan Fernandez. To make a guess that would fit the facts of the case is simply an impossibility. The first two or three chapters of de Foe's story are the narration of a story that is absolutely true.

As a matter of fact Crusoe's home, after the wreck, was the island of Tobago; and the traditions of the island are pretty complete, so far as traditions go. Kreutznaer actually lived the life that de Foe described and his diary fell into de Foe's hands. Crusoe's cave is one of the sights of Tobago to this day.

The wonderful interest created by the first part of the story is due to the fact that it is a true personal experience. The weakness of the second part is due to the fact that it is not true, being a creation of the author's imagination. Truth is certainly stranger than fiction and fiction is apt to be weak when compared with fact.

Incidentally, about twenty years ago while I was temporarily acting as editor of a publishing house, I received a manuscript of Robinson Crusoe. The claim of the redactor was plausible. She said that children should not come into contact with bad grammar and slipshod English, therefore she said she had eliminated de Foe's errors of syntax and had trussed up his somewhat vulgar expressions. And she had! The house did not publish the manuscript, for which I have always been sorry, for it was a literary curiosity, as well as a unique specimen of school English.

J. W. REDWAY.

SPEAKING OF THE WEATHER

Did you know:

1. That the larger whirlwinds all turn the same way, on the same side of the equator, and opposite ways on opposite sides of the equator?
2. That weather travels from west to east in the Temperate Zones, and from east to west in the Tropics?
3. That violent hurricanes form in every tropical ocean except the South Atlantic?
4. That in January Sitka is no colder than St. Louis, Mo.?
5. That thunderstorms are large-scale overturnings in the atmosphere, due to instability?

6. That the instability causing thunderstorms is produced not only by local heat, due to sunshine on the day of occurrence, but also by the importation of warm, moist air from the south, and cold, dense air from the north in great cyclonic whirls?
7. That the bora is a cold wind caused by the drawing down by a passing cyclonic circulation of air from a highland, or plateau, where it has cooled by radiation through the clear air?
8. That the chinook wind of the western United States is the same as the Swiss foehn?
9. That it has never been proved that the destruction of forests decreases the rainfall?
10. That tree planting and agriculture do not increase the rainfall?
11. That battles and explosions do not cause rain?
12. That the cool temperatures off the coast of northern Chile and Peru are due to a rising of deep ocean water, under a suction effect of the Southeast Trade Winds, and not to an Antarctic current?
13. That in the North Atlantic the greater part of the warm water that drifts east and northeast toward Europe, and modifies its climate, has not made the side circuit through the Carribbean and the Gulf of Mexico, and hence is not entitled to be called the Gulf Stream?

E. R. MILLER.

FUTURE SETTLEMENT OF AUSTRALIA

IN "Australia in its Physiographic and Economic Aspects," by Griffith Taylor (Oxford; Clarendon Press 1911), attention is called to the potential occupation of the six provinces of this continent. 10.17 per cent. (319,000 square miles) is available for close white settlements; 17.2 per cent. (520,000 square miles) is available for close colored settlements; 27.9 per cent. (829,000 square miles) is good pastoral land; 19.6 per cent. (580,000 square miles) is arid pastoral land with rainfall less than 10 inches per annum; the remaining 24.6 per cent. (726,000 square miles) is useless desert. In other words, 44 per cent. of Australia is arid, either entirely useless or useless in bad seasons; 17 percent. is suited for tropical agriculture; 39 per cent. is suited for profitable white settlement. Bearing in mind the fact that Java with one-tenth the area of that part (17 per cent.) of Australia suitable for tropical agriculture has a population of 30,000,000, and that the well watered, temperate area of Australia is about one-fourth the extent of similar lands in the United States, a large increase in population may be anticipated. Judging from the rate of increase in the United States, and barring all political considerations, Mr. Taylor estimates that the present population of Australia, 5,000,000, may become 19,000,000 before the close of the century.

H. E. GREGORY.

EDITORIAL COMMENT

IT takes time to overcome the momentum of an educational movement which has continued for some time, and it takes another period to get a reform movement under way. It is now five or six years since a definite effort to humanize high school geography began. The report of the N. E. A. committee urging this change was made at the Denver meeting in 1909 and the report of the committee appointed by the Association of American Geographers, urging the same action, was made at Boston in the following December. But any effort to materially modify the character of a branch of study does not accomplish very much in the secondary or elementary schools until the new order of things shows itself in the text books. Necessarily the teaching in these schools is largely influenced by the text books used. Several of the physical geographies which have been written in recent years introduced a small amount of matter dealing with human relationships, but they have not adequately met the requirements of the more progressive teachers. During the past summer two books have been published, books which make man and his activities and interests the center of treatment. Professor Dryer's *High School Geography* (Complete edition), and the *Elements of Geography,* by Professors Salisbury, Barrows and Tower, will be heartily and enthusiastically welcomed by many teachers immediately, and by still more as time goes on. The two books are similar only in the fact that they lay emphasis on matters of a social, historical and economic nature. Pure physiography is reduced to smaller proportions and much human geography is introduced. Both books are called *geographies,* and not *physiographies* or *physical-geographies.* In one book or the other, every teacher who wishes to modernize his teaching, ought to find nearly what he is looking for.

The appearance of these books marks a turning point in secondary school geography in the United States. We believe that scores of geography teachers will now take new courage and will find new interest in their work. The conditions are favorable for a strong forward movement. Let us pull together. In every city and county let us see that our subject is well represented on the programs of educational meetings. Let us organize geographical clubs, as is being done in a number of cities and states. Let us make every effort to induce school authorities to select teachers of geography with the same care that they select teachers of physics, history, Latin or any other study. Let us begin this very autmn to infuse a new spirit into geography. We can do it,—not in a year nor in two years, but gradually. The organized efforts of the history teachers during past years is now showing results; history and history teaching are on a distinctly

higher plane in the schools than they were. Organized effort has done it. *Geography teachers can do as much.*

Probably few people realize what a remarkable growth in circulation the National Geographic Magazine has been making. It now equals or exceeds the circulation of such widely-read magazines as the World's Work, The Review of Reviews and the Outlook, and has distanced some of the other old, standard periodicals. The excellence of its illustrations has been one of the largest factors in increasing the popularity of the magazine. It means a great deal to geography to have a geographical magazine going into a hundred and fifty thousand homes. Such a condition can not fail to stimulate a wider interest in the subject. The very fact that a paper bearing the name "Geographic" can win such a following among business and professional men means much. When children see that the one of the family periodicals bears the name "Geographic" and deals with geography, they are likely to hold the subject in higher esteem because of that fact. Furthermore the fact that father is a member of a National Geographic Society is not a bad thing for Johnny's interest in his school geography. The signs of the times are propitious.

There is still another recent event of very great significance to American geographers. During eight weeks covering September and parts of August and October, a party of about seventy European and American geographers have been on a prolonged field-trip across the United States from the Atlantic to the Pacific and back again. Seldom, if ever, has such a representative body of geographers travelled over any country. Distinguished members of the geographical societies of nearly every European nation, numbering over forty, accepted the invitation of the American Geographical Society, and together with a somewhat smaller number of Americans, journeyed over the United States in a special train, visiting nearly every place of primary geographical importance. Professor W. M. Davis organized and directed the excursion. Every detail was worked out with the precision which always characterizes Professor Davis's undertakings. This trans-continental excursion, bringing together for two months many of the world's leaders in geography and taking them over our country, is sure to have gratifying results. It is one more evidence that geography in America is in vigorous development. We welcome most heartily our European guests; we pay our tribute to the American Geographical Society, to an unknown benefactor, and to PROFESSOR WILLIAM MORRIS DAVIS.

A LABORATORY EXERCISE ON A PIEDMONT GLACIER AND ITS DEPOSITS

Materials for each student Topographic map of the Controller Bay Region, Alaska; Chief Mountain (Mont.) sheet; each to be purchased from the U. S. Geological Survey, Washington, D. C.

For general class use. Chitina Quadrangle, Alaska. (Folded map in Bull. 374, U. S. Geological Survey or a map of Alaska in an Atlas.

Purpose of exercise. To study an existing piedmont glacier and its deposits, and their relationships to human affairs.

General. The Controller Bay area is in the coast range range of Alaska, the Chief Mountain area in the Rocky Mountains of United States. Note how much farther north one area is than the other, the meridians being closer together and converging more on the Alaska map. How many miles long is a degree of longitude on the Alaska map? On the Montana map? The annual precipitation in the Controller Bay region is about 150 inches; in the Chief Mountain region, 30-40 inches. In which of these is the proportion of this falling as snow probably greatest? In spite of difference in (a) altitude, (b) distance north of the equator, and (c) distance from the ocean, the two areas do not vary considerably in amount of melting of glaciers, the range of temperature in the Controller Bay area being from a maximum of 90° in summer to a minimum of 2° above zero in winter, while in the Chief Mountain area the similar range is from approximately 88° in summer to 48° below zero in winter. In which area is summer melting greatest, considering length of summer? In which, then, is there greatest excess of snow falling in winter and not melting in summer? Bearing of this on size of glaciers?

Topography and Small Glaciers. How high are the mountains of the Controller Bay map? Do the larger ice masses coming from outside the area of the map, suggest higher mountains to the north (see Chitina Quadrangle, hanging on wall or map of Alaska)? To what height above sea level do the Controller Bay glaciers descend? Briefly contrast Kushtaka glacier in Alaska with Blackfoot Glacier in Montana in (a) altitude, (b) shape, (c) size, (d) surface slope,—explaining reasons for difference. Is Slope Glacier on the Controller Bay map a valley glacier? What does the distribution of glaciers on Ragged Mountain suggest as to direction of prevailing winds bringing snowfall?

The Piedmont Glacier. Bering Glacier is a piedmont ice sheet exactly like the Malaspina glacier (see textbook of physical geography) but only a small part of it is shown on this map. Approximately what area in square miles? What name is given to land rising through an ice sheet, as south of First Berg Lake? How many feet to the mile does the border of Bering Glacier descend on Nichawak Mountain? Account for the lobate shape of the

terminus of Bering Glacier. What holds in the water of the First to Fifth Lakes? Probable reason for name of First Berk Lake?

Drainage. What are the sources of the water of Bering River? What name for its many branching channels in Bering Lake? Why are there so many channels west of Mt. Campbell? Why does the outlet of Kushtaka Lake follow so indirect a route to Bering Lake?

Glacial Deposits. The ridge south of Kushtaka Lake is a narrow terminal moraine. Built at a former extension of what glacier? Does the topography suggest lateral moraines extending northward from it? What name for the sloping plain south of this terminal moraine? Locate a larger feature of the same origin on this map. What causes Bering Lake? Would you expect to find submerged deposits containing remains of salt water animals and plant fossils beneath this lake? Why? Explain the present course of the lower Bering River. Do the deposits (see explanation of map symbols) in eastern Bering Lake tell whether the tide still rises and falls in this fresh-water lake?

Applied Geography. There are extensive deposits of good quality anthracite and bituminous coal in the hills between Bering Glacier and River and Martin River Glacier, and some petroleum near the coast between Katalla and Chilkat (see symbols for mines and oil wells on map). This is better coal than any in western United States. Look at a map of North America in a geography or an atlas and tell whether it would probably be cheaper to ship Pennsylvania coal by rail to San Francisco and Seattle or Controller Bay coal by steamer from this point near Copper Range, Alaska. How would you lay out a railway from Carbon Mountain, near Canyon Creek, to the Pacific Ocean at the mouth of lower Bering River? From Carbon Ridge near Shepherd Creek to the mouth of Katalla River (Behring Lake is so shallow that it could be crossed by a trestle)? What does the relative number of houses at the villages of Katalla and Chilkat suggest as to depth of water for ocean steamers in these two parts of Controller Bay? Controller Bay is shallow throughout, except for narrow channels. Do you think Controller Bay is becoming deeper or shallower? Why? What protection has Controller Bay (see Chitina Quadrangle, hanging on wall or map of Alaska) from southwest and westerly storms? Same for Cordova, 50 miles to the west? If it cost as much (a) to build a protective breakwater at Martin Islands for Katalla harbor, (b) to dredge and keep open a channel and build long piers for a port on the coast east of Bering River, or (c) to build the extra miles of railway from Katalla to a junction with the railway leading to Cordova, which of these ports would you consider best for shipping this coal?

Review. Summarize briefly the conditions of existing glaciation in the Cotnroller Bay area; in the Chief Mountain region. What relations do the existing glaciers of the Controller Bay region bear to human affairs? Probably more or less than in the Chief Mountain region? L. M.

QUESTIONS ON NORTH AMERICA AND EUROPE— A GEOGRAPHIC COMPARISON

By ELLA M. HUNTTER,
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1. What parts of eastern North America are in the same latitude as Madrid, Venice, Dresden, London?
2. Compare summer and winter temperatures of Lisbon and New York, Lisbon and San Francisco, Paris and Quebec, Paris and Seattle, Bergen and Fort Churchill, Bergen and Sitka. Account for similarities and differences.
3. Why are Louisiana and Florida more subject to killing frosts than southern Spain, the Riveria or Sicily?
4. Compare the amount and location of arid lands in the United States and in Europe. Explain.
5. In what part of Europe will you find forest conditions similar to southern Canada? steppe regions similar to western Kansas? fertile grassy plains similar to our prairies? Regions of sub-tropical vegetation similar to southern California? semi-arid plateau regions similar to Arizona?
6. Compare the wheat-raising areas of Russia and the central part of the great central plain of North America with reference to winter and summer temperature, rainfall, surface, origin and character of soil, ease of transportation of wheat, manner of transportation, size of farms, use of farm machinery, life of farm laborers.
7. Compare Switzerland and Colorado as to area, surface features, scenic attractions, population, occupations of people. Explain differences in occupations.
8. Compare difficulty of building north and south railroads in Europe and in North America. East and west railroads. Explain.
9. Compare the advatnages of the Danube and the Mississippi as routes of trade.
10. What European waterway most nearly approaches the Great Lakes -St. Lawrence waterway in North America as a highway for commerce?
11. Compare the number of canals used extensively for trade in Europe and in America. Explain.
12. Compare the following manufacturing cities as to
    (1) Ease of obtaining raw materials
    (2) Available water power
    (3) Nearness to coal fields
    (4) Supply add intelligence of labor
    (5) Ease of access to great markets

(6) Policy of government in regard to protection of home industries
(7) Colonial markets favoring goods from mother country
(8) Amount of capital available
(9) Relative advantage of early start
(10) Value of goods produced;—
Cotton Manufacturing.
Manchester, England; Fall River, Massachusetts.
Wool manufacturing.
Leeds, England; Lowell, Massachusetts.
Iron and steel.
Essen, Germany, Pittsburg, Pa.
Carpets.
Brussels, Belgium; Philadelphia, Pa.
(11) Compare the advantages of London and New York as commercial centers. Of Odessa and New Orleans.
(12) Why is the continent of Europe less well fitted for political union than North America?